R E P O R T R E S U M E S

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A STUDY TO DETERMINE THE EXTENT TO WHICH INSTRUCTION TO UNIVERSITY FRESHMEN IN THE USE OF THE UNIVERSITY LIBRARY CAN BE TURNED OVER TO TEACHING MACHINES. FINAL REPORT.

BY- WENDT, PAUL R. AND OTHERS
SOUTHERN ILLINOIS UNIV., CARBONDALE

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A BRANCHING TEACHING-MACHINE PROGRAM WAS DEVELOPED TO TEACH FRESHMEN TO LOCATE MATERIALS WITHOUT THE HELP OF A LIBRARIAN. THE STUDENT WAS SEATED IN FRONT OF A CONSOLE IN A DARKENED, QUIET, AIR-CONDITIONED ROOM. USING A KEYBOARD, THE STUDENT WAS ABLE TO CALL UP ON A SCREEN ANY ONE OF 150 SLIDES. PICTORIAL AND PERFORMANCE FRAMES WERE DEVELOPED TO MAXIMIZE TRANSFER TO THE ACTUAL SITUATION ON THE LIBRARY FLOOR. AN EXPERIMENTAL GROUP OF 66 STUDENTS WAS ASSIGNED TO LEARN TO USE THE LIBRARY FROM THE TEACHING MACHINE ONLY. A CONTROL GROUP OF 53 STUDENTS WAS TO LEARN THE SAME CONTENT FROM A SERIES OF LIBRARY TOURS AND ILLUSTRATED LECTURES. A GROUP OF 74 STUDENTS RECEIVED NO INSTRUCTION IN THE USE OF THE LIBRARY. NO SIGNIFICANT DIFFERENCES IN THE GAINS IN ACHIEVEMENT SCORES BETWEEN THE EXPERIMENTAL GROUP AND THE CONTROL GROUP WERE DEMONSTRATED. THIS REPORT DESCRIBES THREE OTHER STUDIES--(1) DEVELOPMENT OF A FILM TO MOTIVATE STUDENTS TOWARD AN INTEREST IN BOOKS AND OBJECTIVE MEASURE OF STUDENTS' INTEREST THROUGH INFRARED PHOTOGRAPHY OF STUDENTS DURING A VIEWING, (2) DEVELOPMENT AND TESTING OF AN AUDIO PRESENTATION TO REPLACE WRITTEN WORDS IN THE TEACHING MACHINE PROGRAM, AND (3) DEVELOPMENT AND TESTING OF A PROGRAMED COURSE TO TEACH GRADUATE STUDENTS HOW TO DO RESEARCH ON U. S. GOVERNMENT DOCUMENTS. (JM)

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FINAL REPORT
On
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Made Under Provision of Title VII
of Public Law 85-864
Known as the National Defense
Education Act of 1958.

Submitted By
Southern Illinois University
Carbondale, Illinois
July 1, 1963

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We herewith transmit the Final Report on Research Conducted Under U.S.O.E. Grant # 7-11-076.00 Made Under Provision of Title VII of Public Law 85-864 Known As The National Defense Education Act Of 1958.

Dr. Paul R. Wendt, Chief Investigator
Chairman, Department of Instructional Materials
and Professor of Education

Dr. Ralph McCoy, Co-Investigator
Director of Libraries

Mr. Grosvenor Rust, Assistant Investigator
Assistant Professor of Education

Dr. Willis Schwartz, Dean of the Graduate School

July 1, 1963

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A STUDY TO DETERMINE THE EXTENT TO WHICH INSTRUCTION TO UNIVERSITY FRESHMEN IN THE USE OF THE UNIVERSITY LIBRARY CAN BE TURNED OVER TO TEACHING MACHINES

Ever since experimentation with programming was initiated several years ago in the Department of Instructional Materials, the prime interest has been to automate some content instruction at the college freshmen level in order to release instructors from this increasingly heavy burden and give them time for opportunities to work with students individually and in small groups at a time when students badly need this personal guidance. As a content area, therefore, the instruction of freshmen in the use of the University Library was selected. Approximately 4000 entering freshmen had previously received this instruction by guided tours in groups of 50 and by two lectures in groups of 150 students. This meant over 100 tours and endlessly repeated lectures were saddled on every available librarian, who also had to correct 12,000 papers covering three assignments in the Library. The papers, incidentally, were often handed back a month after the assignment was made when the reinforcement would certainly be near zero.

In case the difference between branching and linear programs is not familiar, it should be explained that while linear programs usually require all students to go through identical steps, branching programs vary the instruction depending on errors students make in answering multiple choice questions or depending on various other choices they can make in the program. Linear programs use consistent positive reinforcement; branching programs do not.

The branching rather than the linear technique was used because, first of all, the instruction had to be completely automated. It seemed then, and it still seems probable now, that in the linear program with

constructed answers, the over-hasty, careless, or sly student is more liable to get himself into an impasse requiring personal attention of a teacher than in the branching program which impedes such a student by repetitions or helps him by remedial circuits.

Secondly, the branching technique allowed for a much higher degree of individualization of instruction since it not only allows the student to proceed at his own rate, as the linear program does, but also adjust the content to the individual student's ability and knowledge.

Thirdly, multiple choice questions used in the branching programs make it possible to elicit wrong responses which have already been trained into the student and which it was felt would not be extinguished by mere lack of reinforcement. For example, almost all incoming freshmen have been trained to "ask the librarian" when they are in any difficulty. Such an action by thousands of freshmen would be manifestly impractical, a waste of time for both students and librarians. This answer was therefore elicited as a wrong response in order to get the opportunity to point out to the student that it would be far more efficient in the end if he learned library procedures for himself.

Equipment and Facilities

The search for audio-visual equipment, assisted by NAVA, revealed no projector capable of producing any slide in its repertoire from a keyboard. A month was wasted trying to adapt an Eastman Cavalcade projector to this function. The discovery of the Random Selector manufactured by the Serkes-Tarzian Co. of Bloomington, Indiana, for the broadcasting industry solved the problem.

The programmed instruction facility at Southern Illinois University consists of a darkened, quiet, air-conditioned room of approximately 8 x 12 feet. A student is seated in front of a keyboard console consisting of ten buttons for units, five for decades, and three buttons for hundreds. The program is presented to the student by means of random access two-by-two Sarkes-Tarzian slide projectors located in a booth behind him. Using the keyboard, he can call up on a screen any one of 150 slides stored in the projectors. For a number of reasons it was decided to present the program to the subject by projection rather than by the printed page. First, the air-conditioned, darkened room makes possible the greatest laboratory control over the isolated subject. Second, projection of the colored slides at a comfortable distance in a darkened room produces much greater impact than poor reproduction on paper. Third, the projectors provide a very flexible system, inasmuch as it is possible to revise and replace individual slides at any time. Entire programs can be changed in a few seconds by changing the lift-out drums on the projectors. The system proved extremely durable and dependable for months of operation.

A twenty-pen Esterline Angus data recorder was employed to record the behavior of each subject. This record provided accurate data on time, choices made, and sequence of branches.

Characteristics of the Program Media

Teaching the skills of using the library is very similar to an industrial training problem. Two techniques, pictorial frames and performance frames, were therefore used which would maximize transfer to the actual situation on the library floor. Instruction frames incorporated Kodachrome photographs. Performance frames required the subject to carry out some task before proceeding.

Boom Shelves
REFERENCE SECTION
PROJECTION SCREEN
LEARNING ROOM
STUDENT
EXTERNAL-AUDIO CHART RECORDER
VISUAL PANEL
RANDOM ACCESS DIGITAL TAPE RECORDER
PROJECTION BOOTH
PRINT-OUT UNIT

SCALE: 1" = 2'

All of the instruction frames were half print and half Kodachrome picture in a vertical frame with the print above and the picture below. The upper part of the frame was used for printed commentary essential to utilization of the picture as instruction. The purpose of the pictures was to help the students recognize on the floor of the library items mentioned in print. For example, shelf guides, special dictionary stands, location of call numbers, and other physical elements were shown. Very large close-ups and graphic devices made it possible to call attention to details of such things as catalog cards and withdrawal slips. The frames of the programs were scrambled considerably to restrict the student to serious study and to minimize guessing. In a study by Rust the use of pictures was validated by having one random sample of freshmen use the programs with pictures (n=30) and another comparable sample without pictures (n=23) -- that is, with print only.[1] On the criterion tests the gain of the first group was significantly better than that of the second group at the .05 level of confidence.

TABLE 1

Analysis of Covariance on Gain Scores
Holding SCAT Constant

Source	MS	df	F	p
Within	36.44	61	5.23	$<.05$
Between	190.64	1		

[1]Grosvenor Rust, "A Study to Explore the Effectiveness of Color Photographs in Intrinsically Programmed Automated Instructional Materials." To be published. Supported by a grant from NDEA, Title VII.

The use of pictorial frames is not the only method used to maximize transfer to the real-life situation in the library. Another device used is the performance frame. This type of frame, interspersed in three of the programs, calls for the student to solve a performance problem presented to him on the screen. For example, some performance frames require the student to look up catalog cards in an actual card catalog tray placed on a table beside him. Only after the subject locates the correct catalog cards is he able to answer multiple-choice questions in the program and proceed with it. Similarly, at other times he is asked to look up dictionary definitions, encyclopedia entries, and find books on shelves located in the Learning Room.

The performance frames were validated by comparing the sample of freshmen in the execution of a library assignment after completing programs containing performance frames on the one hand and on the other hand a program containing no performance frames. All students were given actual assignments to carry out on the floor of the library. They were rated by an observer using an objective check rating sheet. The programs containing performance frames led to much better terminal behavior in carrying out these tasks than did the program containing no performance frames.

A summary of research on simulators by Fox has shown that too much realism in a simulator inhibits learning and lowers the transfer to the life situation.[1] The catalog trays, book shelves, dictionaries, etc., in the programmed instruction Learning Room were actual library materials

[1]James H. Fox, Driver Education and Driving Simulators, Washington, D.C., National Education Association, 1960.

and therefore highly realistic, but the environment in the Learning Room was not. The quiet seclusion and individual items for practice provided the simplification of reality which focused learning on essentials and leads to better terminal performances.

Procedure

From over a hundred sections of English 101, twelve were chosen at random to participate in the experiment. Four (n=66) were assigned at random to learn to use the library from the teaching machine only (the experimental group), four (n=53) were to learn the same content from a series of lectures (the control group), and four (n=74) were to get no instruction in the use of the library at all (the zero group). Students are normally assigned to A, B, and C English 101 classes by an English Proficiency Test. All three of the above research groups contained one A class, two B classes, and one C class. To assure comparability between the instruction in the experimental group and in the control group, the control group lectures were given by a professional librarian, who participated in the programming and structured his lectures on the programmed material. He also used in his lectures the Kodachrome slides that were produced for the instruction frames. Thus, the lectures benefited from the very close examination and ordering of content which the machine programming required. Roe has also shown that instructors participating in programming subsequently give significantly better lectures than an instructor who has not participated.[1]

[1]Arnold Roe, "Comparison of Branching Methods for Programed Learning," Journal of Educational Research, 55:407 (June-July, 1962).

Because there were 66 subjects in the experimental group, only one program a week could be given and the lectures were given once a week too.

It was necessary to construct a criterion test since no instrument suitable to the nature of the experiment was available. The only published test known to have any possibility of use was the Columbia University Library Orientation Test for College Freshmen (1955).[1] It could not be used because it was not valid for testing the knowledge and performance required by the unique physical organization of the university library. This was an important item because the nature of the major objective for the instruction given in the experiment was performance--the ability actually and quickly to locate materials needed for study without the help of a librarian.

The criterion test was therefore constructed of items designed to evaluate the subject's ability to perform according to the criteria set before experimentation began. Assistance in this was provided by the professional librarian assigned to the project's advisory staff. Many of the items were from successful tests in use previous to the beginning of this study.

Validity was evaluated in two ways. Content validity was determined by having samples of freshmen, upper classmen (juniors and seniors), students taking specialized courses in library instruction, and professional librarians complete the test. Each group in turn made higher scores than the previous group. The mean score and the individual scores were examined. The 13 professional library faculty of the Southern Illinois

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[1]Published by Bureau of Publications, Teachers College, Columbia University, New York.

University Morris Library had a mean score of 69.6 and the median was 70. The total possible score was 73 and the range was 64-73. All concurred on the validity of the instrument.

The second method, concurrent validation, was to correlate the criterion test scores with the student's actual performance in carrying out assigned tasks on the library floor. The tasks were scored by means of an objective rating sheet. The correlation between the criterion test and the performance test was 0.65.

All subjects in all three groups, experimental, control, and zero, were given this test in the first week of the autumn quarter. The test was administered again six weeks later after the instruction had been concluded. A retention test was given at the end of the quarter. An alternate form was deemed not necessary because pretest scores indicated the subjects came to the university with very little technical information on the use of the library.

Data

The gains between the pre-test and the post-test were the dependent variables of the experiment. Scores were obtained on the English Proficiency Test and also on the SCAT (School and College Ability Test). The Esterline-Angus pen recorder kept a record of all the choices of each student, which made possible an item analysis of the programs. Questionnaires were used to obtain considerable information on library sources and experience available to the students from high schools from which they came. Few students dropped out of the experiment during the quarter due to illness or other causes. The drop-outs were quite equally scattered throughout the twelve classes involved.

Results

Analysis of variance showed no significant difference in the gains in achievement scores between the machine group and the lecture group. Since the hypothesis to be tested was that the machine could do as well as the lectures, and since the lectures had profited enormously from the programming technique and from the pictorial slides developed for the machine, this result was gratifying. Both experimental and control groups were significantly better than a zero group which received no instruction at $<.001$ level of confidence, showing that both methods of instruction were worthwhile.

TABLE 2*

Simple Randomized Analysis of Variance on Gain Scores

Source	MS	df	F	p
Treatments	599	2	22.39	$<.001$
Within groups	26.75	190		

*See Table 4 for mean gain scores.

The same results came from the retention test. Both the experimental and the control group did significantly better ($p<.001$) than the zero group on the retention test.

TABLE 3

Simple Randomized Analysis of Variance on Retention Test Scores

Source	MS	df	F	p
Treatments	678.3	2	13.80	$<.001$
Within groups	49.14	104		

To experienced teachers, this would seem to be obvious, but many college instructors believe that the best way to teach students how to use the library is simply to turn them loose in it and let them learn by trial and error.

To compare these improved lectures and the programed instruction with the old type lectures and to minimize the Hawthorne effect, the old type lecture was presented to a new sample of students by Kinescope. The criterion test gains showed significant difference at $<$.001 level in favor of the improved lectures and programed instruction.

TABLE 4

Comparison of Mean Differences of Gain Scores

	Experimental	Control	Zero	Kinescope
average gain	10.97	10.87	5.78	5.1
N	66	53	74	46
	t	df	p	
t_{EK}	5.06	110	$<$.001	
t_{CK}	4.4	97	$<$.001	
t_{ZK}	0.57	118	---	

The branching technique proved its value in that some bright or informed students were able to get through the individual programs in less than 10 minutes whereas other students took more than 40 minutes.

There was great individual variation between students in bypass performance. Five students out of the 66 in the experimental group were able to negotiate all the different bypasses. Some students were not able to

negotiate any of the bypasses. Others negotiated two or three bypasses only. Such individualization of instruction would not have been possible in linear programs.

As in other teaching machine experiments, the students in an attitude questionnaire showed a decided interest in learning from the teaching machines. There was no preference for any particular program or part of a program.

A further analysis brought out some interesting points. Among the A groups, those with high scores in English proficiency, the zero group did just as well in gains as the experimental and control groups. It seems that students with high English proficiency scores are able to use the library without either programmed instruction or lectures.

The students in the three groups (experimental, control and zero) were divided into high, medium and low levels on SCAT. *t*-tests were computed between each level on the gain scores. There were no significant differences between the three levels when the library material was learned by using the teaching machine.

The lecture results indicated that students with low SCAT scores did not gain as much as students with high SCAT scores ($t=2.07$, $df=29$, significant at $< .05$ level of confidence). The lecture students in the medium SCAT range had gain scores which were intermediate between the students with high SCAT and low SCAT scores. There were no significant differences between levels within the zero group. This seems to indicate that the mode of instruction may not affect the learning of the more intelligent students but it may affect the learning of the less intelligent students.

An analysis of the data collected on the high school background of the students revealed that there was no significant relationship between on the one hand the library facilities offered in their high schools or in instruction given them in one way or another on the use of the school library and on the other hand their performance on the pre-test. In relation to their gains between the pre-test and the post-test, of these background variables only one was significant at $<.001$ level. ($t=3.49$; $df=68$; $<.001$) This was "seating capacity of the school library." The *t*-test was between students (n=36) on the one hand coming from high schools where the seating capacity met the seating space standards of the American Library Association and on the other hand students (n=34) coming from high schools whose libraries did not meet these standards. Other factors such as the amount of instruction they received and the number of books in the school library, and the number of professional librarians available and whether the subjects had been library assistants were not significantly related to their ability to pick up instruction quickly.[1]

Discussion

Undoubtedly, bypasses and remedial circuits, especially those based on review questions at the end of the program, are the most interesting future subjects for investigation. It was found, for example, that when a difficult bypass question was placed right in the main line of instruction, the students shied away from it because they could see how hard it was. When, on the other hand, they were given an opportunity actually to enter the bypass before seeing the first difficult question (four were

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[1] Ruth E. Bauner, "The Relation Between High School Library Resources and Instruction and the Morris Library Pre-Test Scores for Freshmen," unpublished research paper, Southern Illinois University, Carbondale, 1961.

designed to minimize guessing), some students, not knowing what was meant by a hard question, were tempted to enter the bypass and try the first question although they had no chance of passing it and were returned immediately to the main line of instruction. These results were just the opposite from what was predicted. Coulson[1] has suggested voluntary exits from remedial circuits. Some students in the experiment wished there were voluntary exits from bypasses. That is, during the sequence of four bypass questions, some students for some reason changed their minds and wanted to get back on the main line and not skip the instruction. Thus, voluntary exits from bypasses will be used in the future.

Review questions placed at the beginning of a program based on a previous program were a nuisance and a waste of time, because building in the necessary remedial circuits made the program slow to start. A student eager to begin a new unit of instruction with a new program found himself spending considerable time on the previous program.

The subjects were divided into high, medium, and low levels on the basis of their reading comprehension scores. There were significant differences in gain score between the three levels.

TABLE 5

Comparison of Mean Differences of Gain Scores

	t	df	p
pix & print: High vs. Medium	-2.68	24	$<.02$
High vs. Low	-4.19	7	$<.001$
Medium vs. Low	-1.92	23	$<.10$

[1]John E. Coulson and Harry F. Silberman, "Effects of Three Variables in a Teaching Machine," Journal of Educational Psychology, 51:135-43; June, 1960.

The lower the reading comprehension score the higher was the gain score. A possible hypothesis to be explored is that these better readers out of habit did not study the Kodachrome pictures (because so often in textbooks the pictures are merely fillers) and thereby they failed to respond correctly to some questions based on the pictures.

An important variable uncovered was the relationship between the pictures and the printed text in each instruction frame. In some cases, the print merely called attention to the picture which contained the essential instruction. For example, one of the bypass entry question frames was based entirely on items in the accompanying picture. In other cases, the print and the picture both provided instruction. Sometimes the picture merely illustrated the print information without being essential. Never, however, was the picture merely embellishment in the way cuts sometimes are used in a text merely to relieve the page of print.

Summary

Freshmen were taught how to use the University's Morris Library by programmed instruction of the branching type equally as well as by lectures improved by the programming process. The branching system allowed some students to complete programs in one-fourth the time others used. Pictorial Kodachrome instruction frames and performance frames (requiring carrying out tasks during the programs) were validated by check-rating students on actual assignments in the library. Students using pictorial frames and those using performance frames were better than students not using either of the media.

INFRARED FILM ANALYSIS STUDY

The Problem

One of the greatest problems in college is to introduce students to the world of books. The experiment in programmed instruction described above was intended to give freshmen instruction in the use of the library in the most efficient manner but there remained a problem of intriguing students into exploring the vast resources of the university library. In a state university only a small percentage of students come with a driving interest in books and knowledge. Hoveland's research on film motivation has indicated that an attitude can be modified by a film but not changed.[1] Since a number of studies, including some done at Pennsylvania State University, indicate that other audio-visual media are often less effective, it was felt that only a film would be most likely to provide any modification in attitude. A decision was made to avoid all subjective data based on attitude questionnaires and collect only objective data on students' interest in the film.

Procedure

Six films on orienting freshmen to library usage produced by other universities were screened first to determine the suitability of the story treatment to identify mistakes made which could be avoided. The quality of the films in general was low. The style varied from innocuous to patronizing. Most common was the film type which starts out with "Jane and George are sent to the library by their instructor to look up an assignment."

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[1]Carl I. Hoveland and OTHERS, "Communication and Persuasion: Psychological Studies of Opinion Change," Yale University, 1953.

This trite approach was rejected entirely because freshmen entering college today are too sophisticated for this type of motion picture. Such an approach could easily leave students with a negative attitude rather than motivate them positively toward the library.

It was decided, therefore, to have the film production unit at Southern Illinois University write and produce an original film. It was decided to abandon entirely the "tour of the library" type of treatment and instead, to give the students some perspective on the development of verbal communications and the history of books. A basic decision was to avoid all historical re-enactment and to use a simplified type of animation. The policy decision was made to keep the film to ten minutes since it was felt that if any modification of the students' attitude was to be effected it could be done in this time as well in multiples of this time. Both humor and color were to be employed. Furthermore, the humor was to be unconventional and subtle rather than straightforward or heavy-handed.

The script was written by an English professor on the faculty of Southern Illinois University who has a cross-appointment as a script writer with the film production unit. Numerous conferences were held on the story with the script writer, the director of the film production unit, the principle investigator, the co-investigator, and the assistant investigator. It was decided that the first part of the film should be largely historical but that the second half should try to impress the student with the intriguing range of subjects in books available in a large university library.

Production was on 16 millimeter Kodachrome. Processing was done at the Memphis Laboratory of the Eastman Kodak Company. A gifted art student did the animation. All photography was done in the studio of the film

production unit at Southern Illinois University. Sound commentary was recorded by the script writer who had experience in the theatre. Musical excerpts were from a stock library. The entire production took approximately 12 months.

The film has had a number of public showings, the most notable of which was at the annual convention at Miami, Florida, of the American Library Association in the Spring of 1962.

Data

The film, entitled "No, But I Saw The Movie," was shown to a number of freshmen groups. Their interest and enthusiam was evident. It was necessary, however, to get some objective measures of this behavior. It was therefore decided to record students' actual reaction to seeing the film. This was accomplished by taking motion pictures of them with infrared film during the showing of the motivational film. The showings were held in a small auditorium located in Morris Library seating approximately 150 students. Invisible infrared lamps were installed to cover the front two rows of the audience. The camera, loaded with infrared film, was positioned in a control room located in the front wall of the auditorium and photography was accomplished by shooting through the sound-proof glass observation window. The camera was loaded with 400 feet of film so that a continuous "take" could be made during the entire running time of the motivational film. The camera was synchronized with the motion picture projector so that a subsequent frame-by-frame analysis could be made. Three groups of approximately four students each were photographed in this manner. The steps involved in analyzing the infrared film record were as follows:

Step 1: Three experimenters viewed the infrared films and the motivational film simultaneously. A set of synchronized projectors made the simultaneous viewing possible. The experimenters concentrated on observing the behavior of the Ss in order to determine what types of behavior the Ss engaged in. The Es then discussed methods of recording behavior and the types of behavior that should be recorded. It was decided that an attempt would be made to record all responses made by the Ss since in many instances an S would sit quietly for one or more minutes, usually giving the observer time to record behavior without missing other behavior of the Ss. The use of a check list to record the behavior was not considered feasible for this project since too much time would be spent finding the correct "box" to check while part of the film would be missed.

Step 2: A synchronized projector was used during the recording process to minimize variation in running time of the film over a number of trials. Each of the four subjects per film was observed independently for the recording process. Originally it was planned to block out the other three subjects from the observer's view so that he would not be distracted by noticing behavior of the adjacent Ss. This was not necessary in actual practice because a) the non-observed Ss did not tend to distract the E's attention from the observed S and b) the Ss were seated in such a position that it was impossible to completely block out the adjacent subject(s) without also blocking out part of the observed S.

A stop watch was used to record consecutive time from the beginning of the infrared film (the point at which the picture actually started.) Ss' behavior and the time it occurred were recorded on a sheet of paper. Three independent trials were recorded for each of the twelve Ss. One experimenter recorded all trials. This was not one of the experimenters who had seen the films previously and discussed the methods of recording. However, this E was instructed in the recording procedure by two of the original E's.

Step 3: A second E (one of the original three) then took the three individual record sheets for each subject and compiled them into one record per S. Only behavior recorded on at least two of the trial sheets during a given time period was transferred to the master record. The master record sheet contained a) time in five second periods along the horizontal axis and b) subjects along the vertical axis. Ss' behavior was recorded at the time it occurred.

Step 4: The master record sheet was then surveyed to determine the points in time at which at least 2 Ss engaged in some noticeable behavior. These "critical times" were recorded on a separate sheet of paper and given to a third E (one of the original experimenters.)

Step 5: This third E, with the help of an assistant, viewed the motivational film. While viewing the film the Es marked down on the film script where the "critical times" occurred. For example, if one of the "critical times" was 7 minutes 20 seconds after the start of the film, the experimenter with the stop watch would call out 7:20 at the appropriate time. The assistant, who was watching the film and the script, would then write down 7:20 at the appropriate point on the script.

Step 6: The script, with times recorded, was returned to E 2. E 2 then wrote on the script (next to the appropriate time mark) the behavior which had occurred and the number of Ss engaged in this behavior.

Script time was recorded from the beginning of the film title. (See Appendix.)

Table 1 reveals the most important result of the experiment,-that in each of the groups of four there was one individual who made practically no observable reactions to the film. In group one this was subject one. In group two it was subject four and in group three it was subject four. It may well have been chance that caused 25% of each of the three samples to be a person of such a type that he did not respond with laughter to humor scenes when most of the subjects around him were laughing. On the other hand this tends to refute the notion long held by the motion picture industry that a film is more enjoyable by everyone when viewed in a group. It may be hypothesized that the subjects who did not laugh were reacting negatively to their neighbors' amusement but a more likely hypothesis is that these subjects acted as individuals in reacting to the film.

Table 1 also shows that there was considerable movement of many kinds during the showing of the film. There was a wide variety of behavior to observe and it was possible to classify this at least into seven categories. It was originally intended that the subjects of the infrared photography would be identified, and an analysis made of their subsequent use of the library as compared to an equivalent group who did not see the film. An attempt was made to identify the students whose behavior had been analyzed. Black and white photographs (7½ x 9½) of the students were made from the infrared film (at the point of the film where the lights had been turned after the

Table 1

Behavior of Subjects While Watching the Film

Results

Right Screen:

S #1: Never laughs or grins; relatively few movements--those made are usually chin rubbing or adjustment of glasses; talks once.

S #2: Acts sleepy and rubs eyes several times; faint smile or smile (7 times--4 or 5 of these smiles are in the "slow down" sequence); moves feet a lot.

S #3: Swings legs and chews gum; smiles and laughs (3 times); talks (3 times).

S #4: A lot of hand movement (often rubs face); smiles and laughs (16 times, even shakes with laughter at one spot); talks (5 times).

Middle Screen:

S #1: A lot of general body movement interspersed with long periods of quiet; laughs and grins (6 times); talks once.

S #2: Several head moves and body shifts interspersed with periods of little or no action; laugh (9); talks (3 times).

S #3: Mainly sits quietly with some position shifts: laugh once; talks (3 times).

S #4: Sits very quietly--about the only movement is eyeblink: turns head or shifts positions once in awhile. Never laughs or smiles.

Left Screen:

S #1: Many hand to face movements; grins (2 times).

S #2: For some periods doesn't do anything: grins and laughs (5 times); turns head talks (3 times); a sloucher; toward end of film scratches chest and looks at watch.

S #3: Rubs eyes, neck, face often; grins and laughs (6 times); talks (3 times).

S #4: Gum chewer--stops and starts a lot: few body movements; leans forward once at a point where others laugh; never laughs, smiles, or talks.

Table 2

INFRA-RED FILM RECORD ANALYSIS

Behavior While Ss View Film

Time in Minutes	General Movement	Smile or Laugh	Talk	Interest	Tension Release	Sleepy Bored Restless
0:00 - 1:20	12	-	-	-	-	-
1:10 - 1:15	-	1	-	-	-	-
1:20 - 1:30	4	4	2	-	-	-
1:50 - 2:10	2	9	1	-	-	-
2:30 - 2:40	5	-	-	-	-	-
2:40 - 2:45	-	2	-	-	-	-
2:50	-	-	2	-	-	-
2:55 - 3:00	2	1	-	1	-	1
3:00 - 3:45	7	-	1	-	-	-
3:45 - 4:10	-	3	-	2	-	-
4:30	3	1	-	-	-	-
4:55 - 5:05	-	-	-	-	6	-
5:20 - 6:00	-	-	-	-	-	10
6:15 - 7:00	2	6	4	1	-	-
7:15 - 7:20	-	1	-	1	-	-
7:35 - 7:45	4	2	-	-	-	-
7:55 - 8:25	8	1	-	-	-	-
8:30 - 8:45	-	2	1	-	-	-
8:55	-	1	-	-	-	-
9:20	-	-	1	-	-	-
9:05 - 9:40	-	6	-	3	-	-
9:55 -10:05	-	1	1	-	6	-
10:10 -10:30	-	3	-	1	-	-
10:50 -11:05	2	3	1	-	-	-
11:15 -11:20 End	-	-	-	-	-	4
11:30 -11:55*	5	2	1	1	-	1
12:00	-	-	-	-	1	-
12:05	12	1	-	-	-	4
Total	68	50	15	10	13	20

*11:30 on is post film behavior recorded before lights came on.

movie and the students were preparing to leave the auditorium). It turned out to be impossible to identify these students because no record of the Sb identification photos was kept by the University contrary to expectations. These categories are identified in Table 2. This shows the combined reactions of all 12 subjects in these categories. The time intervals are large enough to provide a conveniently short table and yet they are small enough to identify the particular scene to which the reactions occurred. Appendix A consists of a shooting script of the film together with a summary of the reactions observed to particular scenes.

It is immediately evident from examination of Appendix A that there was indubitably a slightly delayed reaction to individual scenes. There can be no question for example that the laughter reaction to scene 16 was to the appearance of a pig in the house in scene 15. Similarly it will be found that amusement on the part of the subjects usually appeared in overt behavior at the moment when the scene appeared on the screen following the one containing the humor. These following scenes were not humorous; therefore, the conclusion of a delayed overt reaction is inescapable.

It should be noted that this delayed reaction could not be attributed to experimental error. The reactions were <u>not</u> recorded in this experiment by an observer with a stop watch; the reactions were recorded instantaneously on infra-red motion picture film exposed by motion picture camera synchronized with the motion picture projector projecting the motivational film. This produced a frame-by-frame concordance of the motivational film and the infra-red film record. In step one of the analysis mentioned above both films were projected simultaneously side-by-side on a screen by projectors which were electrically interlocked. Since the films were running at sound speed (24 frames a second) it was possible to record reactions within an accuracy

of 1/24 of a second. If it had been profitable it could have been possible to determine by this accurate method the exact moment within any particular scene when the subject reacted. The delayed response to humor has been known to theatrical business for a long time. Commedians are accustomed to "wait for the laugh". With infra-red photographic records it is possible to time the delayed response quite accurately.

Appendix A reveals the following scenes which elicited considerable laughter.

Time in minutes from beginning of Script	Script Scene Number	Description of Scene
1. 1:50 - 2:10	23	tablet breaks on man's foot
	24	"censored" speech
2. 6:15 - 7:00	57	Cal & Freddie in theater
	58 - 80	dust jackets of books and shots of Cal who becomes increasingly more frightened
3. 9:05 - 9:40	107	boy in browsing room : slow motion
	108	boy floats to chair & reads : slow motion
	109 - 110	boy reading book about Hitler

The following scene elicited apparent boredom:

1. 5:20 - 6:00	47	Gutenberg's press
	48	press turning out books
	49	monk crossing Europe
	50	press turning out books
	51	Morris Library
	52	Freddie freshman towers over library
	53	Freddie's face
	54	Freddie & Cal tower over library
2. 11:15 -11:20	125	monestary in ruins
	126	monk with pipe

Conclusions

Infra-red photography by a camera synchronized with a motion picture projector provides an objective, accurate method of recording visible

behavior during the showing of a motion picture. The infra-red light is invisible to the subjects being photographed and they are therefore completely free to react normally. They are not required to introspect and register their feelings about the film at any time. They need not be aware that they are being photographed.

The analysis of the behavior can be as objective as desired. In this particular experiment some of the categories involved some implications such as "bored" and "release from tension" but such implications are not necessary. On the whole the method is quite reliable; the three experimentors were in complete agreement as to the categorizing of the reactions.

The accurate frame-by-frame synchronization of the film to be tested and the infra-red record makes possible a timing of reactions to within 1/24 of a second. This may open up possibilities of studying individual differences in observable reactions in a continuous unified series of stimuli such as a motion picture. The clues concerning the subjects in this experiment who did not react to the film opened up a research lead which might make some progress in determining whether there is any truth to the supposition that some people are more influenced by motion pictures than others. Certainly this pilot experiment indicates such a suspicion.

Using this method of infra-red photography a number of important questions concerning the value of particular motion picture techniques and their effectiveness of particular subjects under particular conditions of environment could be investigated.

AUDIO-PLUS-PICTURE EXPERIMENT

Introduction

As in the previously reported experiment on programmed instruction to orient freshmen to the use of the University library, each frame was in a vertical format, the lower half of the frame being occupied by a Kodachrome picture and the other half by sufficient print to facilitate understanding of the picture. As reported, in one of the analyses the subjects were categorized in three levels of ability according to their Reading Comprehension scores. Then their gain scores were compared by the means of t-tests. Among the groups that saw the regular frames, with picture and print, the lower the reading comprehension score, the higher the gain score. In an attempt to explain this unexpected result, it was hypothesized that pictures in many textbooks have little instructional value and therefore the better readers were habituated to skip them, relying wholly on the content of the print. Since in such frames the print was auxiliary and the main instruction was in the picture, the better readers missed some valuable instruction and did poorer on the criterion test.

This clue led to the audio-plus-print experiment. It was hypothesized that if the student did not have to read the print but could listen to it through an audio presentation he would spend more time examining the picture. This should tend to force even the good readers to examine the picture more closely. It would slow down fast readers and eliminate the variance in reading ability among the students. Furthermore, the subjects would be receiving information through two sensory channels at once which might prove to be more efficient. A random access tape playback could perform this function.

Equipment and Facilities

This new audio-plus-picture medium was made possible in the early part of 1962 by the first production models of the Teleprompter Digital Tape, a random access tape recorder. This is manufactured by the Gates Radio Company in Quincy, Illinois. (Production on this machine has now been suspended until the machine can be completely redesigned to lower its cost. Since there is not other random access tape recorder on the market, this means that the research on such equipment must be suspended, except by persons already owning this model, until a new design comes on the market in several years.)

The random access tape player consists of a belt of magnetic tape 13" wide. Across this width are available 100 separate recordings, each running 90 seconds. Any one of the recordings can be summoned at will within a few seconds by a control mechanism. At the end of each play the tape rewinds automatically and plays again.

Two modifications in this equipment had to be made in order to make it useable for the audio-plus-print experiment. First it had to be tied in with the existing control console. This was done by bypassing the crude control mechanism on the machine and wiring it into the large control console which subjects used to summon slides from the Sarkes-Tarzian projectors. Slides and recordings were synchronized. When the subject wanted to summon frame 231, he punched this in on the control console; the Sarkes-Tarzian control console put frame 231 on the screen while the random access tape recorder played the recording for frame 231 through a loud speaker in the experimental room.

The second modification of the digital tape was to shorten the playing time of each track. This was necessary because not enough channels

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the possibility that the subject would want to listen to the audio message more than once and this modification eliminated a 79 second delay.

A further modification of the equipment was rewiring to cause the tape to repeat automatically and immediately after rewinding. Thus, since the rewind speed was five times the playing speed, the machine would replay in only 3 seconds after a full 11 second recording. Therefore, the recorder was able to match the speed of the Sarkes-Tarzian projectors and minimize reinforcement delay.

Procedure

Forty students from an interductory psychology class were randomly selected to form a control group (n=20) and an experimental group (n=20). The subjects of the two groups were matched individually on SCAT and on the pretest scores.

The control group received the three programs as originally produced with print-plus-picture in the instruction frames. The entire program content presented to the audio-plus-picture (experimental) group was identical with that seen by the subjects in the basic print-plus-picture experiment. For the experimental group the print instruction was masked off in the instruction frames so that the students saw only the Kodachrome picture, the instruction being given by the tape. The wrong answer frames were also masked off, leaving the screen blank. The diagnostic question frames were presented visually as in the print-plus-print group, since it is well known that multiple choice questions given orally are very subject to errors from misunderstanding.

All students were given the criterion test on the usage of the library twice, once as a pre-test and once as a post-test. The post-test was

given within two or three days after completing the programs. Again it was deemed that these students were so lacking in knowledge in the use of the library that it was unnecessary to have two alternate forms of the criterion test. SCAT scores were of course available for each subject. The Esterline Angus chart recorder kept a record of all frame choices by each subject and a running time record.

Analysis

t-tests of the gain scores on the criterion test showed that the audio-plus-picture group did significantly better at the .05 level of confidence than the print-plus-picture group. Comparison of the average time required by each of the two groups to accomplish the program showed that the audio-plus-picture group took significantly longer at the .01 level of confidence than the print-plus-picture group.

TABLE 1

Comparison of Mean Differences

	t	df	p
On Gain Scores	2.47	19	$<.05$
On Time to Complete Program	3.9	18	$<.01$

Conclusions

The hypothesis that programmed instruction using two sensory modes instead of one would be more efficient was not supported. On the contrary, the audio plus the visual modes took quite significantly more time than the purely visual mode. An obvious supposition why this occurred is that the audio mode, as mentioned before, narrows the variance in acquiring this

information by the pre-determined speed of the commentary elective as a good average. In the print-plus-picture version, however, even though it required the eyes both to read the print and to examine the picture, good readers could speed through the reading part and save time. (There is no research to indicate whether some people can absorb information from pictures faster than others.) Good readers, therefore, in the sample of the print-plus-picture group could have lowered significantly the time required for this group to accomplish the program.

On the other hand it is clear that using two sensory modes for the program improved the learning. A question might be raised to whether the pacing of the program by the audio component may not have slowed down some of the faster readers so they improved their score enough to bring up the level of achievement of their entire group. This could be determined by future experiments in which the audio is paced at different speeds.

The random access digital tape player seems to have a significant [illegible] presenting programmed instruction both in education and in public service such as information centers in transportation terminals and in department stores.

EXPLORATORY EXPERIMENT ON GRADUATE LEVEL LIBRARY INSTRUCTION

Introduction

University librarians are required to provide extensive instruction in the use of the library to two groups. The first is freshmen who need orienting to the most elementary techniques in locating information. The previous experiment with four units of programmed instruction showed this could be accomplished by programmed instruction equally well as by lectures by professional librarians.

The other point at which instruction is necessary is in training advanced students in research techniques and specialized fields of information. One such field is that of the United States Government Documents. Good information on how to do research in this field is available in such textbooks as Shores.[1] It might be assumed that such advanced students would be fully capable of picking up these techniques from such textbooks. This was not the case. The reason may be that the instruction is purely verbal or that the instruction is poorly organized. As a result, librarians are required to spend between one and two hours explaining to the prospective researchers how to locate material among the United States Government Documents. For this reason it was decided to write and test a program on U. S. Documents.

Procedure

As usual, programming began with a close examination of the material as presented in current textbooks. A universal organization of this subject matter is to begin with an exposition of how a bill originates and procedes through Congress. In other words, the subject starts with the organization of the government, particularly with the legislative branch. Logically the executive branch is taken up next since it executes the laws; and finally the

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[1] Louis Shores, Basic Reference Sources. Chap. 113, pp. 207-227, American Library Association, 1954.

judicial branch which interprets the laws. The extensive examination of content characteristic of programmed instruction revealed that this traditional sequence had only one virtue --the chronology of the life of the law. The program to be written, however, clearly had a need to concentrate first on that branch of government which produces the most documents. This would be the area in which most graduate student research would be done. It is true that the legislative branch, through the Congressional Record, would exceed the other two branches in sheer volume of publication but the Congressional Record is of a limited interest except for people doing research in political science and in a few other areas.

The same can be said of the judicial branch. Its publications would be of interest principally to a limited group of researchers.

The executive branch with its many subdivisions issues by far the greatest number and variety of publications. It was decided therefore that this would constitute the principle area for the programmed instruction, traditional [illegible].

The previous programmed instruction for orienting freshmen employed the branching technique, pictorial frames and performance frames, as described in the previous report. All three techniques were validated in efficiency, by the criterion test, or by performance of assignments on the floor of the library.

For the program on U. S. Documents it was decided to use the branching system as before, but no pictorial frames and no performance frames. A performance test was the criterion test and was administered to the subjects after they completed the program. The reasons for these changes follow.

The rationale for pictorial and performance frames as previously used in the freshmen program were to maximize the transfer from the programmed

instruction to the actual performance on the assignments in the library. This was appropriate for use with thousands of students. Here, however, in a program on U. S. Documents, the subjects would be a few highly trained individuals with different skills and objectives than college freshmen. It was not appropriate for advanced students for two reasons. First of all, they would be much more able to interpret purely verbal instruction and these individuals would come to the library with a definite purpose and would be more highly motivated to put their instruction into practice immediately. Therefore, the gap between instruction and practice would be considerably lessened and transfer would be facilitated. Secondly, the most important reason for not using pictorial frames was that U. S. Documents did not lend themselves to photographic presentation. Most of the pictorial areas of the frames would have been occupied by organization charts or by photographs of pamphlets which would contribute little to the instruction.

Inasmuch as no pictorial elements of the frames were to be used, it was decided also to not use the random-access projection system developed for the freshmen program but to present the Documents program on cards organized as a scrambled book.

Data

The subjects were 10 graduate students in doctoral programs, five in the experimental group and five in the control group. It was ascertained from each one that they had no previous knowledge of any consequence concerning how to do research in the United States Documents. The program consisted of 100 frames. It was presented to the subjects in a small, quiet room, well lighted and air conditioned, where he could study the program in seclusion and as long as he wished. The subjects indicated choices on the diagnostic

questions on a separate answer sheet. This was of course necessary to compute the error rate for individuals and for the group in general. A record was kept by the experimenter of the total time elapsed by each subject in going through the entire program, but there was no time limit set.

The control group did not use the programmed instruction but read chapter 13 on "Government Publications" by Shores.[1] Immediately after completing the program each subject was given three practical assignments on the floor of the library in locating specific items of information in a United States Document. The assignments were as follows:

Locate a government publication
that states the basic student charges
in the individual institutions of higher
education in the United States.

Answer:
Higher Education Basic Student Charges, 1961-62;
tuition and fees, board and room, by W. Robert
Bokelman and Louis A. D'Amico

U. S. Dept. of Health, Educ. & Welfare, Office
of Educ. OE-52005-62, Circular 635

Recently the Reference Department of the Library of
Congress compiled A Guide to the Study of the
United States of America. Can you find this
study? In what year was it published?

Answer:
Documents Center
E
LC 2.2
UH 3/4

The government has issued a publication on Animal Diseases.
What Department was responsible for the publication and
in what series did it appear?

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[1] Ibid., pp. 207-225

Answer:
U. S. Dept. of Agriculture
Yearbook 1956
630.6
US0y
1956

The completed assignments were scored by a professional librarian.

Results

The results of this pilot experiment indicated that this type of purely verbal program on a subject at the graduate level was probably of not much more value than the textbooks in spite of the fact that the content had been revised in the process of programming. Error due to the limited number of subjects in this pilot program was probably aggravated by the fact that graduate students at this high level are extremely individualistic. Previous research on programming has indicated that the effectiveness of programmed instruction depends to a great extent on the characteristics of the student. In particular, gifted students tend to resent the slow progress of the typical programmed instruction. Doctoral candidates belong in this category and it is quite likely that the "pall effect" was operating to interfere with the effectiveness of the programmed instruction.

From this pilot study it seems likely that it would have been more efficient to provide textbooks on United States Documents which had been reorganized after the content and organization had been closely scrutinized and evaluated according to the methods of programmed instruction. In other words, programmed instruction as it is generally known was not suitable for teaching United States Documents to doctoral candidates.

It should be mentioned that a possible important factor in minimizing the value of programming was the discontinuity of the subject involved

in this study. The distinct cleavage between the three principal parts of the United States Government and the many quite unrelated subdivisions of the executive branch make for a discontinuous program. This kind of subject content is perhaps better handled in the flowing prose of a textbook.

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APPENDIX A

The Development of the Control and Recording Equipment Used In The Experiments

The development of the teaching machine used in the experiments required a period of approximately eight months of intensive research and electro-mechanical work. The development and research facilities of several major firms which manufacture electro-mechanical equipment of the sort needed were contacted. The discovery of the Sarkes-Tarzian Random Selector Projection equipment through a contact at the University of Indiana solved the problem of presenting the pictorial program to the subject. However, the control panel which was incorporated in the Sarkes-Tarzian Projector was extremely unsatisfactory for use by a student. The same was true of the remote controller which was supplied by that manufacturer. It was then necessary to develop a control panel which could be operated easily by any of the subjects which might be introduced to this learning situation. Furthermore, research indicated that the equipment had to be simple enough and easy enough to operate so that it did not introduce any additional variables which might tend to obscure the results of the study. Careful attention was given to the size of the operating buttons, the layout of these buttons on the console panel and even to the color of the buttons. These factors were essentials since the record of the students' behavior was to be taken from the electrically recorded impulses coming from the operation of these control buttons. Mistakes that were induced because of poor arrangement or hard to reach or depress control buttons would tend to invalidate the data to be gathered. A number of layouts were studied and analyzed for such problems. The research facilities of three companies were approached for help here. National Cash Register Company, the International Business Machines Corporation, and the

Victor Adding Machine Company were approached for advice and estimates on the construction of a suitable control panel which would also be capable of operating the recording device necessary for obtaining the data. Only one firm, the Victor Adding Machine Corporation, was able to come up with a design which lay within the budget set aside for the development of this equipment. However, the firm was confronted with the annual summer shutdown for a vacation period of one month. This made it impossible for them to give delivery of the panel which had been jointly designed by the investigators and the research team of the company. It was then necessary to bring all the ability of the research team's electro-acoustical technicians, the University Research Shops, and the investigators to bear on the task of building a panel to suit the research experiment.

The final design of the control console panel was so successful that it was possible to admit individuals having physical limitations resulting from cerebral palsy to the learning experience from the machine. Even with their inaccurate gross motor movements they were able to operate the panel successfully and complete a course of instruction which was very comparable to that of any of the normal subjects who participated in the learning experiences. The panel provided access to 200 slides and control of four of the Harkness-Tarrian projection units. Depressing the control buttons activated the projector and the recording devices simultaneously. Each button was flanked with a pilot light which reminded the subject when it had been depressed and would thereby give him a record of what slide he had asked for when he pushed the button.

The control console utilized an intricate electronic switching panel which also had to be designed and built. Special purpose relays, a time control and recording device had to be incorporated to record the responses and behavior of each subject on a per-item basis.

The difficulty the experimenters had in locating equipment which would be adequate to study the problems to which solutions were being sought indicates the unique character of the study at the time it was instituted. The series of experiments which have been conducted with this equipment has reinforced the original intent that the devices assembled would provide for utmost flexibility in studying a wide variety of problems of instruction and various kinds and modes of instructional materials. Even though the designing and building of research equipment was the least of the matters of interest to the investigators, it has proved to be that careful thought about the utilization of electronic aids for studying learning and materials has been highly repaid in the degree and amount of knowledge obtainable through their use.

APPENDIX B

Annotated Script for the Infrared Film Analysis Study

NO, BUT I SAW IT IN THE MOVIES

Title VII, Library Usage Motivational Film Study

Revised Script

WRITER: J. Joseph Leonard

January 8, 1963

INFRA-RED ANALYSIS	PICTURE	NARRATION
	1. STILL PICTURE OF CALVIN THE CAVE MAN...PRIMITIVE SETTING ...TOOTHY GRIN...CALVIN IN ANIMAL SKIN AND CARRYING CLUB	Once upon a time this man was voted by his cave-mates the most likely to stay alive because he had such native talents as
	2. CLOSE UP OF CALVIN'S CAVERNOUS MOUTH	...sharp teeth...
	3. CLOSE UP OF CALVIN'S HORRENDOUS & HAIRY UPPER ARM BICEP	...big muscles...
	4. CLOSE UP OF CALVIN'S KNOBBED CLUB	and Calvin carried a big stick.
	5. REPEAT #1 PICTURE: CALVIN IN CAVE MAN SETTING	Ah, but that was long ago. Today,
	6. CUT TO PICTURE OF CALVIN IN TYPICAL CONTEMPORARY BIG CITY SITUATION: HE IS CONFRONTED WITH LARGE, STRANGE AUTOMOBILES, TRAFFIC LIGHTS ...IN BG TOWERING BUILDINGS, ETC. CALVIN IS NOW REDUCED TO A COWERING COWARD IN THIS STRANGE HABITAT	Calvin the cave man would be a cowardly misfit at any intersection
	7. CUT TO: HEAD-ON VIEW OF HALF DOZEN KINDS OF CARS, FOREIGN AND DOMESTIC...INCLUDING A LOOMING BUS...AS THOUGH SEEN THROUGH THE PRIMITIVE EYES OF CAL...ALL BEARING DOWN ON HIM...CAR FRONTS MIGHT BE PERSONIFIED WITH HOSTILE EXPRESSIONS	confronted with machines we take for granted...

INFRA-RED ANALYSIS	PICTURE	NARRATION
	8. SIDE VIEW OF CALVIN AS HE STANDS AT BLACKBOARD GNAWING ON PIECE OF CHALK AS HE PERSPIRINGLY EYES THE PROBLEM ON THE BOARD BEFORE HIM	or confronted with the simplest of problems. Question:
	9. CUT TO CLOSE UP AND FULL FACE OF CALVIN THE COWERING CHALK CHEWER	Why is Calvin the cave man such a frightened misfit in the middle of the twentieth century and what has this to do with you?
	10. FADE IN PAINTING OF BISON (COLOR) FROM THE CAVES OF ALTAMIRA, SPAIN IN FOREGROUND, SQUATTING AS HE WORKS, IS THE DARK, BARELY DISCERNIBLE FIGURE OF A PRIMITIVE PAINTER AT WORK ON HIS CAVE WALL PAINTING	Well, our story begins approximately 20,000 years ago in caves in Western Europe
	11. DISSOLVE TO COLOR PAINTING OF REINDEER FROM WALL OF CAVE AT FONTE DE GAUME, SPAIN	where we find man exercising one talent that distinguishes him from all other animals on this planet: the ability to draw pictures
	12. CUT TO: BLACK AND WHITE DRAWING OF DOG CHASING RHINO WHO IN TURN CHASES MAN CARRYING STICK	and through pictures to communicate with other human beings distant in time and space. Thousands of years went into the refinement
	13. LAP DISSOLVE INTO PRIMITIVE ALPHABETS, IN COLUMNS	of this exclusively human talent until it flowered into the first crude alphabet...ideagraphic writing, where the symbol or picture stands for the idea.
	14. CUT TO SIMPLE DRAWING OF A STICK HOUSE	This might represent a house. But how do you represent the idea of home?

INFRA-RED ANALYSIS	PICTURE	NARRATION
1:20-1:30 smile or grin 4 Ss movement (rub chin, cross arms, stop gum chewing, body shift) 4 Ss talk: 2 Ss	15. TO PICTURE #14 SIMPLY ADD A PIG...HAVE HIM UNDER THE ROOF OF THE SIMPLIFIED DRAWING OF "HOUSE"	It has been written that way, but I don't think for most of us it quite carries the meaning we like to associate with "home".
	16. (LIVE) PAIR OF HANDS WRITING WITH STYLUS ON CLAY TABLET	By 2000 B.C. man had perfected cuneiform or wedge-shaped writing on clay tablets. But it had a different kind of drawback.
	17. PICTURE: ASSYRIAN READING A CLAY TABLET...IN BG A LITTLE MAN WITH A LARGE TUBA	
	18. SCREEN IS FILLED WITH JAGGED COLOR PATCHES AS LITTLE MAN GIVES ENORMOUS TOOT ON TUBA	
	19. MAN READING TABLET THROWS IT IN THE AIR	
	20. MAN TRYING TO CATCH FALLING TABLET	
	21. MAN STILL TRYING TO CATCH FALLING TABLET	
	22. TABLET LANDS ON SANDALED FOOT AND BREAKS IN PIECES	
	23. MAN HOPPING ON FOOT, HOLDING RED-TOED FOOT IN HANDS ...SWEARING IN ASSYRIAN... DIALOGUE IN BALLOON	
	24. FILL IN SCREEN WITH DIALOGUE BALLOON...OVER WHICH HAS BEEN STAMPED IN BOLD-FACE, BLACK LETTERS: "CENSORED"...GO TO BLACK	

INFRA-RED ANALYSIS	PICTURE	NARRATION
1:50-2:10 smile, grin or laugh: 9 Ss movement (resume gum chewing hand to face): 2 Ss talk: 1 S	25. FADE IN ON (LIVE) PAIR OF HANDS HOLDING PAPYRUS ROLL ...ON ROLLERS WITH TAG, WRITING, ETC...ACTION	For over 4000 years man wrote on papyrus rolls, made from the papyrus reed that grew in the Nile River. In those days there were no paragraphs, no space between words, not even punctuation.
	26. CUT TO PYRAMID OF 60 ROLLS ON LITTLE TABLE...TAGS HANGING FROM SOME ROLLS SAY: HAMLET, LEAR, OTHELLO, SONNETS...A BUST OF SHAKESPEARE LOOKS ON	Papyrus-like clay had its disadvantages. For example, it would have taken sixty average size papyrus rolls to hold all Shakespeare's plays and sonnets.
	27. (ANIMATED) PICTURE OF EMPIRE STATE BUILDING (STYLIZED)...ROLL STARTS OPPOSITE TOP AND UNROLLS TO STREET LEVEL	or one continuous roll eighteen hundred feet long capable of reaching from the top of the Empire State Building all the way down to the street.
2:30-2:40 movement (release tension or restless?): 5 Ss	28. POP-ONS: (OPPOSITE AND FACING EACH OTHER) LEFT HAND COLUMN: CATTLE, SHEEP, GOATS RIGHT HAND COLUMN: CALVES, LAMBS, KIDS	Papyrus was followed by parchment or prepared animal hides. The hides of young animal was called vellum.Today the words parchment and vellum are used interchangeably.
	29. PICTURE (#28) BECOMES A SPINNING BLUR	
	30. FADE IN: (LIVE) PAIR OF HANDS WITH WOODEN WRITING TABLET...CONTINUOUS ACTION WITH PICTURE AND TEXT SYNCHRONIZED	But where did today's book come from? And here you see the answer. The wax-coated tablets on which the Greeks wrote with a metal stylus.
2:40-2:45 grin: 2 Ss		Man figured out these wooden tablets could be hinged together with leather thongs. Then the final step came with the hinging or tying together of parchment or vellum pages.

INFRA-RED ANALYSIS	PICTURE	NARRATION
2:50 talk 2 Ss (one of the Ss who grinned above)		The clumsy great-daddy of today's millions of books.
	31. (LIVE) FADE IN ON DIMLY LIT MONASTERY SCRIPTORIUM SET... A MONK IN A ROBE IS WRITING AT HIS DESK...THIS TO BE DONE IN LOW KEY LIGHTING, BROWNS PREDOMINANTLY...	During the so-called Dark Ages, from approximately 500 A.D. to 1500, manuscripts were copied by thousands of monks in monasteries all over Europe and Asia Minor. These monks kept alive books and the love of books by their patient copying, throughout the centuries long night that had descended on the Western World.
3:00-3:45 general movement	32. COPIES OF BEAUTIFULLY ILLUMINED PAGES GO ON AND OFF THE SCREEN	And curiously or maybe not so curiously it was during this twilight time that perhaps the most beautiful books in all history were produced.
7 Ss talk: 1 S	33. CUT TO: FIGURE OF MONK... BROTHER ALOYISIUS...ROBED ...SANDALED...POISED OVER IRELAND...STRETCHING AWAY TO THE EAST LIES EUROPE...	And this was the time when monks trudged everywhere to borrow or copy precious holy books. Take our friend, here, in Ireland. Name: Aloysius. Destination: Library of the Monastery at Monte Cassino, Italy. Purpose: to copy a certain sacred book. (PAUSE) And we'll check up on you later Aloysius.
3:45-4:10	34. FADE TO: BLACK AND WHITE LINE DRAWING OF TYPICAL UNIVERSITY OF THE MIDDLE AGES...ZOOM IN SLOWLY DURING THE FOLLOWING	After the monasteries came the universities as the collectors, editors and copiers of books.
interest: 2 Ss (continued)	35. DISSOLVE THROUGH TO: (LIVE) HUGE BOOK ON HIGH LECTERN ...HANDS MOVE IN FROM DIMLY LIT AREA...PICK UP THE PONDEROUS TOME...SYNC NARRATION TO FIT ACTION...SCENE PURPOSELY DIM	Universities loaned books to students, true, but there was a string attached. (Hands lift book to remove it...but book is literally chained to the desk...some tugs & much chain noise.)

INFRA-RED ANALYSIS	PICTURE	NARRATION
(continued) smile: 2 Ss (also one of the "interest" Ss grins)	36. (LIVE) LONG SHOT OF STUDENTS INSPECTING AND TAKING AWAY BOOKS IN MORRIS LIBRARY OPEN STACKS... ACCENTUATE THE SCENE BY HAVING IT BRIGHTLY LIT	In open stack libraries today there are no strings or chains attached
	37. SEVERAL STUDENTS AND A BEARDED PROFESSOR ALL WEARING CAPS AND GOWNS... IN LIBRARY OF MEDIEVAL UNIVERSITY...DINGY...DIM LIGHTING...ALL POURING OVER PONDEROUS OLD TOMES... MUFFLERS...GIVE IMPRESSION OF COLDNESS AND DAMP	In those days students and faculty were required to wear caps and gowns in the library
	38. (LIVE...COUNTERPART OF #37) (ALSO LIVE) SHOT OF FELLOWS AND GIRLS IN MORRIS LIBRARY AT TABLE STUDYING IN SPORT SHIRTS, SHORTS, SANDALS, SNEAKERS...ETC.	Not precisely the case today in most American universities.
	39. FADE IN: MAP OF EUROPE WITH SHADOW SLOWLY DISAPPEARING	Meanwhile the thousand year sleep that had begun in the fifth century was coming to an end. With the fifteenth century came the Renaissance. The Renaissance or great rebirth of learning.
	40. MAP OF EUROPE...DONE IN SHADES OF GREY...ARCHING OVER IT, IN A SEMI-CIRCLE OR SUNBURST EFFECT APPEAR THE INDIVIDUAL LETTERS: R E N A I S S A N C E	
	41. ON COMPLETELY BLACK FOREGROUND PAIRS OF PROFILES OF FACES (IN SILVER LINES) POP ON AND OFF THE SCREEN IN VARIOUS POSITIONS...	

INFRA-RED ANALYSIS	PICTURE	NARRATION
4:30 head movement: 3 Ss laugh: 1 S	41. (CONTINUED) VARIATIONS IN HEADGEAR, HAIR STYLES, NOSES, ETC...TO GIVE STYLIZED IMPRESSION OF MEN ENGAGED IN FACT FACE TO FACE EARNEST CONVERSATIONS... PERHAPS HALF A DOZEN PAIRS THAT COME ON THE LIMBO BACKGROUND..DISAPPEAR... REAPPEAR IN ANOTHER LOCATION	A time when men rediscovered the meaning of intellectual freedom.
4:55-5:05 tension release: 6 Ss	42. FIVE VELLUM CODICES COME ONTO THE SCREEN FOLLOWED BY THE NAMES: DANTE... da VINCI...CELLINI... CHAUCER...ST. AUGUSTINE FLASHING ON THE SCREEN	Freedom to read pre-Christian Greek giants. Freedom to read pagan Latin classics. It was a time indeed, whose motto was: Men can do all things, if they will.
	43. MOTTO IN BOLD LETTERS ON GREY BG: MEN CAN DO ALL THINGS...FOLLOWED A MOMENT LATER BY: IF THEY WILL... ON RED BG.	
	44. OLD WOODCUT OF JOHANN GUTENBERG	And a man at this precise moment in history did perfect a means of printing rapidly.
	45. QUICK CUT TO BLACK & WHITE LINE DRAWING OF GUTENBERG'S OLD PRESS ADDED TO PREVIOUS PIC	The man who accomplished the mechanical miracle was Johann Gutenberg, an obscure German printer. And in 1450 started a torrent of words that within the next fifty years
	46. CHART: COLUMN ON LEFT SEGMENTED AND LABELED: PARCHMENT...PAPYRUS... CLAY...OTHERS...ANOTHER AND TALLER COLUMN LABELED "PRINTED BOOKS"	presses modeled after his committed more printed words to paper than man had been able to write in his entire previous history

INFRA-RED ANALYSIS	PICTURE	NARRATION
	47. REPEAT SHOT OF GUTENBERG'S PRESS	from this simple but revolutionary hand press came not only man's past
5:20-6:00	48. (LIVE) SHOT OF PRESS TURNING OUT BOOKS	locked in print, but today's complicated and efficient presses pouring forth millions of words a day.
restless or sleepy:	49. CUT TO: MONK ALOYSIUS A-TRUDGIN' ACROSS EUROPE... HOLD	millions of words a day... quite a contrast to Brother Aloysius who will take over a million steps to copy just one book.
10 Ss	50. CUT BACK TO #48...PRESS TURNING OUT BOOKS	Today, the storehouse for this printed record
	51. DISSOLVED TO SHOT OF MORRIS LIBRARY...EXTERIOR...WITHOUT PEOPLE	is the library. And on every campus the library is the hub of intellectual activity.
	52. CARTOON DRAWING OF FREDDIE THE FRESHMAN, BEANIE AND ALL...STANDING, TOWERING ABOVE AN ACTUAL, BUT REDUCED, PHOTO OF MORRIS LIBRARY	Now here's a big man on campus and he's interested in what this library has that just might interest him.
	53. CUT TO SMILING REACTION SHOT OF FREDDIE...BCU OF FACE ONLY	Right young man? Then suppose we...
	54. CUT BACK TO FREDDIE TOWERING ABOVE MORRIS LIBRARY ...ONLY NOW HE IS JOINED IN THE PICTURE BY CALVIN...WHO IN TURN TOWERS ABOVE FREDDIE AND THE LIBRARY	Well, if it isn't Calvin the cave man. Now there's a real big, big man on campus, but I don't suppose he'd be interested in the library
	55. CUT TO SMILING REACTION SHOT OF CALVIN...BCU OF FACE ONLY ...GRINNING AFFIRMATIVELY THOUGH HE DOESN'T KNOW WHAT HE IS AGREEING TO OR WITH...	Would you Cal? You would!

INFRA-RED ANALYSIS	PICTURE	NARRATION
	56. FAST MONTAGE EITHER OF COLORS OR SERIES OF CLOSE-UPS OF SHOTS OF A BRICK WALL...GLASS...MARBLE... ETC. IN A CROSS BETWEEN AN EXPLOSION AND QUICK PASSAGE THROUGH THE WALLS, ETC., OF MORRIS LIBRARY	Alright, then, suppose we go inside...no, no, Cal, use the door. (FOLLOWED BY LONG GROAN) (AND A BIG EXPLOSION)
6:15-7:00 grin 6Ss (4 of these Ss talk)	57. CUT TO INTERIOR OF DARKENED THEATRE LOOKING TOWARD STAGE FROM ABOUT HALF WAY BACK...IN FRONT ROW, SILHOUETTED, ARE LITTLE FREDDIE AND TOWERING CAL	Well, thanks to Cal we're just in time for the movie.
resume chewing	58. PROSCENIUM ARCH...ABOVE IT ENTWINED IN LETTERS: SIU ...ON SCREEN:	
1 S	59. SCREEN: FEATURE	
position shift	PRESENTATION	
2 Ss	60. SCREEN: DUST JACKET	
	VARIETIES	
	61. SCREEN: WITH A CAST OF MILLIONS	

****

HERE FOLLOWS A SERIES OF DUST JACKETS CHOSEN FROM THOUSANDS. THEY HAVE BEEN CHOSEN ON THE BASIS OF VARIETY OF CONTENT AND ARTISTIC SUITABILITY. I HAVE TAKEN THE LIBERTY TO ATTEMPT A CRESCENDO EFFECT, A KIND OF CATAPULTING THE VIEWER ON TO THE CONTEMPORARY WORLD SCENE

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62. SCREEN: BOOK: PREHISTORIC ANIMALS (PREHISTORIC SCENE ...EXTINCT ANIMALS IN FG... VOLCANO CRATER IN BG, ETC.)

63. REACTION SHOT OF CALVIN... FRIGHTENED

64. SCREEN: BOOK: FRANKENSTEIN (WEIRD ART WORK... SKULL WITH SCRAGGLY HAIR PEERING THROUGH APERTURE IN WALL...A SPIDER... CRACKED PLASTER)

INFRA-RED ANALYSIS	PICTURE	NARRATION
6:15-7:00	65. REACTION SHOT OF CALVIN... MORE FRIGHTENED	
(Continued)	66. SCREEN: BOOK: LA BELLE ET LA BETE (IN BLACK & WHITE...GIGANTIC GORILLA TOWERING OVER CITY SKYLINE HOLDING GIRL IN ONE OUT-STRETCHED ARM AND PAW)	
	67. REACTION SHOT OF CALVIN... REDUCED TO CRINGING, BLUBBERING IDIOCY AT SIGHT OF KING-KONGISH CREATURE THAT DWARFS HIM	
	68. SCREEN: BOOK: THE COMPLETE TALES AND POEMS OF EDGAR ALLEN POE (THE USUAL RAVEN PERCHED ON THE PAGE OF AN OPEN BOOK...PLUS A [illegible]-SOCKETED SKULL)	
	69. SCREEN: BOOK: THE COMPLETE SHORT STORIES OF MARK TWAIN (AT TOP: RIVERBOAT...COL. SELLERS...HUCKLEBERRY... BELOW: TWAIN SMOKING A PIPE ...LETTERING IN RED, GREEN AND BLACK	
	70. SCREEN: MUSIC ALBUM COVER: "MISSISSIPPI SUITE"...	Music
	71. SCREEN: BOOK: HEMINGWAY: THE WRITER AS ARTIST (TONES OF BROWN...CAN'T MAKE OUT IF IT IS A SEASCAPE OR THE BROWN HILLS OF AFRICA...THE NAME "HEMINGWAY" IS IN LARGE WHITE LETTERS & INESCAPABLE)	"
	72. SCREEN: BOOK: THE AMERICAN WAY OF GOVERNMENT (GREEN BG WITH WHITE COLONNADE BLDG. & STATUE OF LIBERTY...NICE CONTRAST TO HEMINGWAY BROWN TRANCE)	"
	73. SCREEN: BOOK: CHRISTIANITY AMONG THE RELIGIONS OF THE WORLD (COLORS: WHITE, BLACK, AND BLUE...WITH	"

INFRA-RED ANALYSIS	PICTURE	NARRATION
6:15-7:00 (Continued)	73. (CONTINUED) ARNOLD TOYNBEE'S NAME PROMINENTLY DISPLAYED)	
	74. SCREEN: BOOK: JEFFERSON: CHAMPION OF THE FREE MIND (JEFFERSON'S HEAD AGAINST A BLUE-BLACK BG...SHADING OFF TO A BROWNISH LOWER HALF WITH WHITE LETTERING)	Music
	75. SCREEN: BOOK: AFRICA (WHITE BG WITH TWO WOOD-CARVED HEADS...IN VIEW OF WORLD SITUATION, SEEMS APPROPRIATE TO ME...AND TO SET UP NEXT TITLE)	"
	76. SCREEN: BOOK: ALBERT SCHWEITZER: MAN OF MERCY (SCHWEITZER HIMSELF STARES STRAIGHT AT THE VIEWER... WITH MUSTACHE AND WINGED COLLAR)	"
	77. SCREEN: BOOK: SPRINGBOARD DIVING (MALE FIGURE IN TRUNKS IN VARIOUS POSITIONS IN MID AIR...WHITE FIGURES AGAINST BLUE BG)	"
	78. SCREEN: BOOK: THE PRACTICAL ECONOMIST (TITLE IN RED...IN BG ARE STACKS OF SILVER COINS OF VARIOUS DENOMINATIONS)	"
	79. SCREEN: BOOK: A PICTORIAL HISTORY OF BURLESQUE (RISING LIKE A COLUMN OF FLESH ON LEFT IS A STRIPPER QUEEN IN HER STOCKINGS & ELBOW-LENGTH GLOVES...ON RIGHT: SERIES OF PIX OF BURLESQUE STARS... INCLUDING W. C. FIELDS... CAN'T BLAME A MAN FOR TRYING)	"

INFRA-RED ANALYSIS	PICTURE	NARRATION
	30. REACTION SHOT OF CALVIN: THROUGHOUT SEQUENCE HE SHRINKS...UNTIL FINALLY HE IS LITERALLY SIX INCH LILLIPUTIAN, LOST ON THE SEAT)	Music
	31. SCREEN: BOOK: ART & OUTRAGE (MODERNISTICALLY DONE FACE IN BLACK, BROAD LINES AGAINST A REDDISH PINK SQUARE)	"
	32. SCREEN: BOOK: THE COMPLETE BOOK OF CHEESE (YELLOW BG... IN FOREGROUND LOW TABLE WITH CHEESES & WINE)	"
	33. INTRODUCTION TO SPACE (BLACK BG...MILLILE CONE SET IN TRIANGLE...TITLE IN YELLOW)	"
	34. REACTION SHOT OF CALVIN... SMALL & FRIGHTENED & BEWILDERED	"
	35. SCREEN: BOOK: FALL OUT (YELLOW-ORANGE LETTERS ON GREEN BG...WITH "T" IN "OUT" FORMING AN ARROW POINTING DOWN)	"
	36. SCREEN: BOOK: THE HYPO-ANALYSIS OF AN ANXIETY HYSTERIA (PLAIN PURPLE WITH SERIES OF WHITE THEN PURPLE THEN WHITE, ETC. CIRCLES, TARGET-LIKE...VERY STRIKING)	
	37. QUICK REACTION SHOT OF HYSTERICAL CALVIN	
	38. SCREEN: BOOK: THE SURVIVAL BOOK (PREPONDERANTLY BLUE BG WITH SLASH OF BLACK ACROSS MIDDLE CONTAINING THE TITLE)	

INFRA-RED ANALYSIS	PICTURE	NARRATION
7:15-7:20 interest: 1 S grin: 1 S	89. SHOT OF CALVIN COWERING IN CORNER OF SEAT...TINY GIANT NOW	As you can see, cave men aren't exactly at home in the twentieth century. Joe, suppose you and I take a quick ramble through the library. OK?
	90. LONG SHOT OF OPEN STACKS	A library is still primarily a collection of the printed record--or books. But today a library
7:35-7:45 general movement: 6 Ss (2 of these show faint grin)	91. OVER-THE-SHOULDER SHOT OF STUDENT LOOKING IN A MICRO-FILM PROJECTING MACHINE--MOVE ONTO SHOT OF STUDENT IN LISTENING BOOTH TILTED BACK IN CHAIR LISTENING TO A RECORD--MOVE TO PROJECTION ROOM WHERE PEOPLE ARE WATCHING A MOVIE--ALSO PEOPLE LOOKING AT FRAMED PICTURES ON EXHIBITION	also has other means of making thought or feeling available in lasting form ...
7:55-8:25 general movement: 3 Ss grin: 1 S	92. GIRL AT MAIN CARD CATALOGUE WRITING DOWN BOOK NUMBER	and you can save a lot of time in the library if you know what you're looking for...For example, here's a young lady who does, notice the time she saves.

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THE FOLLOWING SEQUENCE IS DONE SPEEDED UP

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7:55-8:25 (continued)	93. GIRL CLOSES CARD CATALOGUE TRAY AND IS OFF IN A FLASH	
	94. UP ANGLE SHOT: JUST CATCH LEGS AS SHE FLITS DOWN THE STAIRS TO HUMANITIES SECTION OF MORRIS LIBRARY	
	95. SHE TAKES DOWN FOUR OR FIVE BOOKS FROM SHELF	
	96. IS PLACING BOOKS ON TABLE ...SEATS HERSELF...OPENS NOTEBOOK AND FLIPS OPEN A BOOK AT SAME TIME	

INFRA-RED ANALYSIS	PICTURE	NARRATION
	97. CU OF HAND WRITING FURIOUSLY	Music
8:30-8:45 grin: 2 Ss talk: 1 S	98. MEDIUM SHOT: #1 BOOK DISAPPEARS FROM HER STACK	"
	99. MEDIUM SHOT: #2 BOOK DISAPPEARS FROM HER STACK	"
	100. MEDIUM SHOT: #3 BOOK DISAPPEARS FROM HER STACK	"
	101. MEDIUM SHOT: #4 BOOK DISAPPEARS FROM HER STACK	"
	102. MEDIUM SHOT: #5 BOOK DISAPPEARS FROM HER STACK	"
	103. SHE IS OFF IN A TWINKLING	"
	104. CAMERA CATCHES HER LEGS AS SHE FLITS UP THE STAIRS	"
	105. SHE ZIPS OUT THROUGH THE DOORS OF LIBRARY & IS GONE	"
	106. CUT TO FELLOW IN BROWSING ROOM...HE LOOKING AT ROW OF NEW BOOKS	of course, there's such a thing as taking it easy, too. Just browsing. Like this fellow.
9:05-9:40 interest or grin: 0 Ss (9:20-9:25 was the funni- est spot)	107. FELLOW TAKES DOWN BOOK, OPENS IT,...NODS... GOES TO CHAIR...SEEMS TO FLOAT...OPENS BOOK... READS...	Well, maybe he's taking it too easy. But not all reading is done in the library, Joe, not by a long shot.

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THE ABOVE SEQUENCE WAS SLOWED DOWN TO A DREAM SEQUENCE SPEED (107 & 108)

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INFRA-RED ANALYSIS	PICTURE	NARRATION
9:05-9:40 (continued)	108. CUT TO: SCENE: BED IN FRAT HOUSE...FELLOW RECLINING WITH BOOK...UP... WEARING SWEATSHIRT WITH FRAT LETTERS VISIBLE, OR PARTIALLY...BOOK: HITLER: A STUDY IN TYRANNY...ZOOM INTO BOOK...GO THROUGH... DISSOLVE INTO:	Music
	109. (LIVE) TILT UP SHOT OF SEVERAL NAZI SOLDIERS (HELMET & FACE & UNIFORM COLOR VISIBLE AGAINST THE SKY) COMING ON SCREEN IN RAPID SEQUENCE EACH SHOUTING: "HEIL HITLER!")	"
	110. DISSOLVE BACK TO BOOK... PULL BACK	"
	111. CUT TO: COED IN LOUNGE CHAIR...READING...CAMPUS LAKE VISIBLE IN BG...ZOOM OR DOLLY IN CLOSE ENOUGH TO PICK UP BOOK...IT IS A BOOK ON BIOLOGY...DISSOLVE THROUGH TO:	"
	112. SHOT OF SLIDE CONTAINING HIGHLY ACTIVE CELLS... DARTING HITHER AND THITHER...OR WHATEVER FLAGELLANT IT IS THAT DARTS...DISSOLVE BACK TO BOOK...PULL BACK TO TAKE IN GIRL AND LAKE.	"
9:55-10:05 tension release: 6 Ss faint smile: 1 S talk: 1 S	113. SCENE: CAMPUS LAKE... FELLOW IN CANOE, DRIFTING, AS HE READS...(ANGLE: OFF END OF FISHING PIER) ...BOOK HE IS READING COMES INTO RANGE & FOCUS: THE ENCYCLOPEDIA OF JAZZ... ZOOM IN & DISSOLVE TO:	"

INFRA-RED ANALYSIS	PICTURE	NARRATION
9:55-10:05 (Continued)	114. TIGHT SHOT OF DRUMMER'S BRUSHES BEATING OUT CATCHY RHYTHM ON CYMBAL...GO TO HEAD OF SNARE DRUM...BACK TO CYMBAL...(PICK UP SOUND, LIVE, ON THIS) DISS BACK TO BOOK, LAD IN CANOE	Music
	115. CUT TO: CONTRASTINGLY DIM INTERIOR OF PREFAB HOUSE OR TRAILER...YOUNG WIFE AT IRONING BOARD.. BABY IN PLAYPEN NEARBY...WIFE HOLDING UP A BOOK READING... TITLE NOT VISIBLE...ZOOM IN ON HER FACE...DISS TO:	"
	116. TYPICAL PAIR OF YOUNG LOVERS...HAND IN HAND... ARRIVING AT PEAK OF SUN-DRENCHED PROMONTORY... WAVING GRASS...CLOUDS... BLUE SKY...SHE CARRYING BERIBBONED SUNBONNET IN HAND...SILHOUETTE...DISS SLOWLY BACK TO:	"
10:10-10:30 interest or grin: 4 Ss	117. ROMANCE-DYED FACE OF YOUNG MOTHER AT IRONING BOARD FADES TO:	"
	118. BEWILDERED CAL LOOKING AT VAST IBM-TYPE "THINKING" MACHINE	In this increasingly complicated world you can't just rely on your native talents.
	119. CUT TO: CAL LOOKING AT MODERNISTIC PAINTING	If you do, like Cal, you'll be afraid, bewildered, unequipped for making a living,
	120. CUT TO CALVIN LOOKING AT LONG, LONG ROW OF BOOKS IN THE STACKS	incapable of understanding the world you live in.
	121. DISS TO EXTERIOR OF MORRIS LIBRARY...FREDDIE IS STANDING ALL ALONE...NOW DWARFED BY THE BUILDING	It is in the library that you will find the written, recorded, pictured history of man's journey through time and space.

INFRA-RED ANALYSIS	PICTURE	NARRATION
	122. DISS TO: SURREALISTIC PAINTING: BLUE ON WHITE ...BROKEN GREEK COLUMNS ...HUMAN EYE...LINES TO INFINITY...MODERN STATUARY IN RIGHT FOREGROUND (ROUNDED & WITH HOLES) ...A BIT OF A MOBILE	To the farthermost frontiers of man's artistic imagination ...
10:50-11:05 general movement, laugh, talk: 6 Ss		Your library...centuries in the coming now yours for the using.
	123. CUT TO: (ANIMATED) ALOYSIUS TRUDGING INTO ITALY	Say, like to know what happened to Aloysius the monk: By the time Aloysius arrived at the monastery at Monte Cassino,
	124. SHOT OF MONASTERY IN RUINS...COBWEBS...SPIDER WEBS...SIGN: "CLOSED"	it was out of business. The moral is: Don't take that long getting to your library. Right Brother Aloysius?
11:15-11:20 look around or yawn: 4 Ss	125. SHOT: BCU OF AL'S FACE... WITH PIPE...HE WINKS HIS RIGHT EYE IN FULL & FRIENDLY AGREEMENT.	

END OF FILM

11:30-11:55

grin or interest 3 Ss

hand to face movements: 5 Ss

bored: 1 S

Post viewing behavior Photographed during brief period immediately after end of film. No audience lights yet.

APPENDIX C

Papers and Lectures Given by the Investigators as a Result of the Research Described in this Report

McCoy, Ralph

"Library Orientation via Teaching Machine." Paper read before meeting at Midwest Academic Librarians, Kalamazoo, Michigan, April 14, 1961.

Rust, Grosvenor C.

"The Promise of Automated Instruction for Education and Training in Business and Industry." Seminar lecture given to Illinois Training Directors' Association, Chicago, March 1, 1961.

"Programmed Instruction For an Administrator's Notebook." Lecture given to Southern Counties School Administrators' Workshop, Carbondale, Illinois, March 21, 1961.

"Picture Content in Programed Instruction." Talk presented at Conference on Programmed Instruction at Terre Haute State College, Terre Haute, Indiana, March 24, 1961.

"Automated Instruction." Lecture delivered at Annual Area Education Conference, Carbondale, Illinois, June 23, 1961.

"Understanding Programmed Learning and Teaching Machines." Address given to Mid-term Teachers' Workshop, Edwardsville (Illinois) Community Schools, Edwardsville, January 22, 1962.

"Teaching Machines and Programmed Learning." Address given to Morgan-Scott Teachers' Institute, Jacksonville, Illinois, March 23, 1962.

"Applying Programed Instruction to Industrial Education." Two-day seminar presented to industrial training and education directors, Ascot Hotel, Chicago, May 1-2, 1962.

"Applications of Research in Programed Teaching Materials." Talk given to Anna-Jonesboro Rotary Club, (Administrative Staff of State Mental Hospital constituted much of audience) Anna, Illinois, September 20, 1962.

"Programmed Instruction and Your Child," Address given to 3 Parent Teacher Association meetings; University School, January 14, 1963, and Winkler School, February 4 at Carbondale, Illinois and Edwardsville, Illinois, Combined Schools P. T. A., (Special), March 4, 1963.

Rust, Grosvenor C. "Programmed Instruction - Today and Tomorrow," Address given before Illinois Training Director's Association, Chicago, April 1, 1963.

"Programs for Using the University Library," Presentation of the programs and equipment used in the media research conducted by the investigators. Program presented at National Conference on Implications of New Media for the Teaching of Library Sciences, Workshop, Sheraton-Chicago Hotel, Chicago, May 27-29, 1963.

Wendt, Paul R. "Branching Programs for Research in Automated Instruction," Address given at annual meeting of Audio-Visual Educational Forum, in conjunction with meetings of National Audio-Visual Association, Industrial Audio-Visual Association, The Audio-Visual Conference of Medical and Allied Sciences, Chicago, Illinois, July 24, 1961.

"Individualization of Instruction by Instructional Materials," Address given at meeting of Illinois Curriculum Project, Pere Marquette State Park, November 10, 1961.

"Learning through Programmed Instruction and Criteria for Evaluating New Media," Address given before 11th Annual Regional Conference of the Correctional Education Association, Carbondale, June 19, 1962.

"Preliminary Report on Research with Pictorial Branching Programs in Library Usage Instruction," Paper presented at National Convention of Department of Audio-Visual Instruction, N. E. A., Miami, Florida, April 25, 1961.

"Programmed Instruction for Library Orientation--a Research Discussion," Address given to Conference on Programmed Instruction, at Terre Haute State College, Terre Haute, Indiana, March 24, 1961.

"Programmed Instruction for Teaching Library Orientation," Address given before Annual Spring Conference of Illinois Association of School Librarians, Chicago, April 7, 1961.

"Programmed Instruction to Orient Freshmen to the Use of the University Library," Address presented at National Conference on Implications of New Media for the Teaching of Library Sciences Workshop, Sheraton-Chicago Hotel, Chicago, May 27-29, 1963.

Vendt, Paul R. and
Rust, Grosvenor C.

"Pictorial and Performance Frames in Branching Programmed Instruction," Paper presented at Annual National Convention of American Educational Research Association, Atlantic City, New Jersey, February 21, 1962.